

Lynn M. Powers  
**PUBLICATIONS**

**Journal**

**2005**

1. Arnold, S.M., Saleeb, A.F., Powers, L.M. and Lissenden, C.J.; "High Temperature Characterization and Prediction of Timetal 21S Cyclic and Cyclic-Relaxation Deformation Behavior Using a Multimechanism Viscoelastoplastic Model" in preparation for *Int. J. Plasticity*.
2. Bednarczyk, B.A., Arnold, S.M. and Powers, L.M.; "Coupling Analytical Micromechanics with Structural FEA for Micro/Macro Analysis of Titanium Matrix Composites, in preparation for *Int. J. Plasticity*.

**2003**

3. Salem, Jonathan A.; Powers, Lynn, "Guidelines for the testing of plates," *Ceramic Engineering and Science Proceedings*, v 24, n 4, 2003, p 357-364

**2002**

4. ASTM C 1499-01 "Determination of Monotonic Biaxial Flexural Strength Advanced Ceramics,' primary authors J.A. Salem and L.M. Powers, under jurisdiction of ASTM C28 on Advanced Ceramics, in Annual Book of ASTM Standards, V. 15.01, pp. 779-788, American Society for Testing and Materials, West Conshohocken, Pennsylvania (2002).
5. Powers, L. M., Salem, J.A., and Weaver, A.S., "Stresses in Ceramic Plates Subjected to Loading Between Concentric Rings", Fracture Resistance Testing of Monolithic and Composite Brittle Materials, ASTM STP 1409, J. A. Salem, M. K Jenkins and G. D. Quinn, Eds., American Society for Testing and Materials, West Conshohocken, PA, 2002.

**2001**

6. Salem, Jonathan, Calomino, Anthony; Allen, Robert; Powers, Lynn, "Slow crack growth of sapphire," *Ceramic Engineering and Science Proceedings*, v 22, n 3, 2001, p 289-297.

**1999**

7. Jadaan, O.M., Powers, L.M., Gyekenyesi, J.P., "Multiaxial Creep Life Prediction of Ceramic Members Using Continuum Damage Mechanics and Finite Element Method", *ASME Journal of Eng. Gas Turbines and Power*, Vol. 121, 577-585 (1999).

**1998**

8. Powers, L.M., Jadaan, O.M., Gyekenyesi, J.P., "Creep Life of Ceramic Components Using a Finite Element Based Integrated Design Program (CARES/Creep)" *ASME Journal of Eng. Gas Turbines and Power*, Vol. 120, 162-171 (1998).

## 1996

9. D. A. Gasparini, P. Bonacuse, L. Powers, and A. Romero, "Stochastic Parallel-Brittle Networks for Modeling Materials," *Journal of Engineering Mechanics*, Vol. 22, No. 2, Feb. 1996, pp. 130-137.
10. J. A. Salem, N. N. Nemeth, L. M. Powers and S. R. Choi, "Reliability Analysis of Uniaxially Ground Brittle Materials," *ASME Journal of Eng. Gas Turbines and Power*, Vol. 118, 863-871 (1996).
11. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Durability Evaluation of Ceramic Components Using CARES/Life," *ASME Journal of Engineering for Gas Turbines and Power*, Vol. 118, January, 1996, pp. 150-158.

## 1995

12. S. R. Choi, N. N. Nemeth, J. A. Salem, L. M. Powers and J. P. Gyekenyesi, "High Temperature Slow Crack Growth of  $\text{Si}_3\text{N}_4$  Specimens Subjected to Uniaxial and Biaxial Dynamic Fatigue Loading Conditions," *Ceram. Eng. Sci. Pro.*, 16[4] 509-518 (1995).
13. Jadaan, O., Powers, L.M., Nemeth, N.N, and Janosik, L.A.: "Design of High Temperature Ceramic Components Against Fast Fracture and Time Dependent Failure Using CARES/LIFE Code," Symp. on Design for Manufacturability and Manufacturing of Ceramic Components, Ceramic Transactions, Vol. 50, 1995.

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14. J. A. Salem, N. Nemeth, L. M. Powers and S. R. Choi, "Measurement and Modeling of Strength Distributions Associated with Grinding Damage," *Ceram. Trans., Design for Manufacturability of Ceramic Components*, A. Ghosh, B. Hiremath, J. Halloran, Eds., Am. Ceram. Soc., April, 1994.

## 1993

15. L. M. Powers, J. A. Salem, and S. R. Choi, "Failure Prediction Using the Ring-On-Ring Test and the CARES/LIFE Integrated Design Program," in *Reliability, Stress Analysis and Failure Prevention*, ASME DE-Vol. 55, pp. 55-63 (1993).
16. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Time-Dependent Reliability Analysis of Monolithic Ceramic Components Using the CARES/Life Integrated Design Program," *Life Prediction Methodologies and Data for Ceramic Materials*, ASTM STP 1201, C.R. Brinkman and S.F. Duffy, eds., American Society for Testing and Materials, Philadelphia, PA, 1993, pp. 390-408.
17. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Designing Ceramic Components for Durability," *The American Ceramic Society Bulletin*, American Ceramic Society, Westerville, OH, Vol. 72, No. 12, December, 1993, pp. 59-69.
18. Duffy, S. F., Powers, L. M., Starlinger, A., "Reliability Analysis of Structural Ceramic Components Using a Three Parameter Weibull Distribution", *Journal of Engineering for Gas Turbine and Power*, vol. 115, no. 1, 1993, pp. 109-115.

## Books/Monographs/Special Issues

## **1995**

1. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Durability Evaluation of Ceramic Components Using CARES/Life (Chapter 2)," Advanced Ceramic Matrix Composites: Design Approaches, Testing and Life Prediction Methods, E.R. Generazio, ed., Technomic Publishing Company, Lancaster, PA, December 14, 1995, pp. 17-45.
2. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Designing Ceramic Components for Durability (Chapter 1)," Advanced Ceramic Matrix Composites: Design Approaches, Testing and Life Prediction Methods, E.R. Generazio, ed., Technomic Publishing Company, Lancaster, PA, December 14, 1995, pp. 3-16.

## **1993**

3. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Ceramics Analysis and Reliability Evaluation of Structures Life Prediction Program (CARES/Life) Users and Programmers Manual," (initial release--formally published as NASA TM-106316 in 2003), 1993.

## **NASA Technical Reports**

## **2004**

1. Arnold, S.M., Powers, L.M. and Glovan, R. "Design/Analysis and Manufacturability of Lightweight, Graded, Discontinuously Reinforced Aluminum Flat Faced Propellant Duct Flanges" NASA/TM—2004-213130.

## **2003**

2. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "CARES/Life Ceramics Analysis and Reliability Evaluation of Structures Life Prediction Program," NASA/TM-2003-106316, February, 2003.

## **2000**

3. S. R. Choi, L. M. Powers, and N. N. Nemeth, "Slow Crack Growth Behavior and Life/Reliability Analysis of 96 wt% Alumina at Ambient Temperature with Various Specimen/loading Configurations," NASA/TM-2000-210206.

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5. J. A. Salem, N. N. Nemeth, L. M. Powers and S. R. Choi, "Reliability Analysis of Uniaxially Ground Brittle Materials," NASA-TM-106852, June, 1995.

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6. Janosik, Lesley A., Gyekenyesi, John P., Nemeth, Noel N., and Powers, Lynn M., "NASA/CARES Dual-Use Ceramic Technology Spinoff Applications," NASA TM 111694, National Aeronautics and Space Administration, Lewis Research Center, Cleveland, OH, June 16, 1994, 10 pp..
7. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Durability Evaluation of Ceramic Components Using CARES/Life," NASA TM 106475, National Aeronautics and Space Administration, Lewis Research Center, Cleveland, OH, January 1, 1994, 15 pp.

## **1992**

8. Powers, L. M., Starlinger, A., Gyekenyesi, J. P., "Ceramic Component Reliability with the Restructured NASA/CARES Computer Program", NASA TM-105856, Sept. 1992.
9. Duffy, S. F., Powers, L. M., Starlinger, A., "Reliability Analysis of Structural Ceramic Components Using a Three Parameter Weibull Distribution", NASA TM-105370, September 1992.

## **1989**

10. L.M. Powers, and L.J. Ghosn, "Reliability-based failure analysis of brittle materials", NASA CR 184799, February 1989.

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11. L.M. Powers, and L.J. Ghosn, "Reliability-based failure analysis of contact stress problems", NASA CR 182117, September 1988.

## **NASA Tech Brief**

1. Gyekenyesi, John P., Powers, Lynn M., and Jadaan, Osama M., "Program Predicts Creep Lives of Ceramic Components," LEW-16917, NASA Tech Briefs, Vol. 24, No. 6, June 1, 2000.
2. Nemeth, Noel N., Janosik, Lesley A., Gyekenyesi, John P., and Powers, Lynn M., "Basis and Application of the CARES/LIFE Computer Program," LEW-16207, NASA Tech Briefs, Vol. 20, No. 3, March 1, 1996, p. 102.
3. Nemeth, Noel N., Janosik, Lesley A., Gyekenyesi, John P., and Powers, Lynn M., "Program for Evaluation of Reliability of Ceramic Parts," LEW-16018, NASA Tech Briefs, March 1, 1996.

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## **Conference Proceedings and Presentations**

## **2005**

1. Arnold, S.M., Saleeb, A.F., Powers, L.M. and Lissenden, C.J.; "High Temperature Characterization and Prediction of Timetal 21S Cyclic and Cyclic-Relaxation

- Deformation Behavior Using a Multimechanism Viscoelastoplastic Model" Plasticity 2005, Hawaii, Jan 4 - 8, 2005
2. Bednarczyk, B.A., Arnold, S.M. and Powers, L.M.; "Coupling Analytical Micromechanics with Structural FEA for Micro/Macro Analysis of Titanium Matrix Composites, Plasticity 2005, Hawaii, Jan 4 - 8, 2005
  3. Powers, L. M., "A Nonlinear Viscoelastic Model for Ceramic Materials", presented at the 29th Annual Cocoa Beach Conference and Exposition on Advanced Ceramics & Composites, Cocoa Beach, FL, Jan, 2005.

## 2003

4. Arnold, S.M., Powers, L.M. and Glovan, R. "Design/Analysis and Manufacturability of Lightweight, Graded, Discontinuously Reinforced Aluminum Flat Faced Propellant Duct Flanges" JANNAF, Dec 1-5, 2003, Colorado Springs, Colorado.
5. J.A. Salem and L.M. Powers, "Guidelines for the Testing of Plates" pp. 357-364 in Proceedings of the 27th International Cocoa Beach Conference on Advanced Ceramics and Composites: B, Ceramic Engineering and Science Proceedings, Vol. 24, No. 4, Waltraud M. Kriven and H.T. Lin, editors (January, 2003).

## 2002

6. Powers, L.M., "How to Design and Test for Creep of Ceramic Materials", *Invited* presentation given at the 104th Annual Meeting & Exposition of the American Ceramic Society, St. Louis, MO, April, 2002. Tutorial/Workshop on How to Characterize, Test and Design with Ceramics.
7. L. M. Powers, V. P. Panoskaltsis, D. A. Gasparini and S. R. Choi, "A Nonlinear Viscoelastic Model for Ceramics at High Temperatures," presented at the 5<sup>th</sup> World Congress on Computational Mechanics, July 7-12, 2002, Vienna, Austria, Eds: H. A. Mang, F. G. Rammerstorfer and J. Eberhardsteiner.
8. L.M. Powers, J.A. Salem and A. Weaver, "Stresses in Ceramic Plates Subjected to Loading Between Concentric Rings," pp. 30-45 in Fracture Resistance testing of Monolithic and Composite Brittle Materials, ASTM STP 1409, J.A. Salem, G.D. Quinn and M.G. Jenkins, Eds., American Society for Testing and Materials, Conshohocken, Pennsylvania (2002).

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10. J.A. Salem, L. Powers, R. Allen and A. Calomino, "Slow Crack Growth and Fracture Toughness of Sapphire For a Window Application," pp. 41-52 in Window and Dome Technologies and Materials VII, Vol. 4375, R.W. Tustison, ed., Proceedings of the SPIE, Orlando FLA, April 16, 2001.

## 2000

11. Jadaan, O., Nemeth, N.N., Powers, L.M., Palko, J.P., and Baker, E.H., "Time-Dependent Reliability of Ceramic Components Under Transient Loads," Probabilistic Approaches in Fatigue and Fracture, Soboyejo, A.B.O., Orisamolu, I.R., and Soboyejo, W.O., eds., Trans Tech Publications, Switzerland, 2001. Vol. 200 of Key Engineering Materials, ISSN 1013-9826. Presented at International Mech. Eng. Congress and Expo. November 2000, Orlando, Fla..

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#### **1998**

14. Nemeth, N.N, Powers, L.P., Choi, S.R., Janosik, L.A., and Baker, E.H., "CARES Software for Time-Dependent Reliability of Ceramic Parts," Proceedings of the 1998 Advanced Turbine Systems Annual Review and Meeting, Washington, DC, November 2-4, 1998.
15. Nemeth, N.N., Powers, L.P., and Baker, E.H. "CARES/Life Software for Designing More Reliable Ceramic Parts," Presentation – Physics and Process Modeling (PPM) Review, Cleveland 1998.
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18. Jadaan, O.M., Powers, L.M., Gyekenyesi, J.P., "Creep Life Prediction of Ceramic Components Subjected to Transient Tensile and Compressive Stress States," IGTI-ASME Turbo Expo, June, 1997, ASME paper 97-GT-319.

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19. Powers, L.M., Jadaan, O.M., Gyekenyesi, J.P., "Creep Life of Ceramic Components Using a Finite Element Based Integrated Design Program (CARES/Creep)" IGTI-ASME Turbo Expo, Birmingham, England, June, 1996, ASME paper 96-GT-369.

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20. Jadaan, Osama M., Powers, Lynn M., Nemeth, Noel N., and Janosik, Lesley A., "Design of High Temperature Ceramic Components against Fast Fracture and Time-Dependent Failure Using CARES/Life," Ceramic Transactions: Design for Manufacturability of Ceramic Components Symposium, Indianapolis, IN, Asish Ghosh, Basavaraj Hiremath, John Halloran, eds., American Ceramic Society, Westerville, OH, Volume 50, April, 1995, pp. 121-134.
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25. Powers, Lynn M., Janosik, Lesley A., Nemeth, Noel N., and Gyekenyesi, John P., "Lifetime Reliability Evaluation of Monolithic Ceramic Components Using the CARES/Life Integrated Design Program," Proceedings of the American Ceramic Society Annual Meeting & Exposition, Cincinnati, OH, April 19-22, American Ceramic Society, Westerville, OH, 1993.
26. Nemeth, N. N., Powers, L. M., Janosik, L.A., Gyekenyesi, J.P., "Lifetime Reliability Evaluation of Structural Ceramic Parts with the CARES/Life Computer Program," AIAA 93-1497-CP, Proceedings of the 34th AIAA(ASME)ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference and AIAA/ASME Adaptive Structures Forum, Technical Papers. Pt. 3, La Jolla, CA, April 19-22, American Institute for Aeronautics and Astronautics, Washington, D.C., 1993, pp. 1634-1646.
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31. Duffy, S. F., Powers, L. M., Starlinger, A., "Reliability Analysis of Structural Ceramic Components Using a Three Parameter Weibull Distribution", IGTI-ASME Turbo Expo, Cologne, Germany, June, 1992.

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32. "Reliability based analysis of contact problems", L.M. Powers, and L.J. Ghosn, in Probabilistic Methods in Civil Engineering, Proceeding of the 5th ASCE specialty conference, Virginia Polytechnic Institute and State University, Blacksburg Virginia, May 25-27, 1988, pp. 112-115.